

himself, but is likewise able to extract good work out of other people—a task often more hard to be accomplished than the former one.

The Countries of the World. By Robert Brown, M.A., Ph.D. Vol. iii. (London: Cassell.)

THIS volume is devoted to Central and South America, and appears to us to present a fairly full and trustworthy and certainly interesting account of the countries of this most attractive region. Dr. Brown has evidently taken the trouble to search most of the authorities likely to help him. The illustrations to this volume are unusually good and appropriate.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.]

A Carnivorous Goose

I INCLOSE to you an account of a Golden Eagle, which I have reason to know to be authentic. The possibility of a bird so purely graminivorous as a goose being taught to eat flesh, and acquiring the power of digesting it, is extremely curious. It is well known, however, that cows are largely fed on fish offal in Scandinavia, and I have heard of a Highland cow devouring a salmon which an unwary angler had hid among fern on the banks of a river in Sutherland.

ARGYLL

Isola Bella, Cannes, April 7

"March, 1879.—There is in the possession of W. Pike, Esq., at Glendarary, in the Island of Achil, Co. Mayo, a Golden Eagle, now about twenty-five years old, which was taken from the nest and brought up in confinement. This eagle, in the spring of 1877 laid three eggs, which Mr. Pike took away, replacing them with two goose-eggs, upon which the eagle sat, and in due time hatched two goslings. One of these died, and was torn up by the eagle to feed the survivor, who, to the great tribulation of its foster-parent, refused to touch it, together with the other flesh with which the eagle tried to feed it, Mr. Pike providing it with proper food. The eagle, however, in course of time, taught the goose to eat flesh, and (the goose having free exit and ingress to the eagle's cage) always calls it by a sharp bark whenever flesh is given to it, when the goose hastens to the cage and greedily swallows all the flesh, &c., which the eagle, tearing its prey to pieces, gives it.

"I saw them in May, 1878, when, the goose being a year old, had made a nest in the eagle's cage, and laid eleven eggs, and the two birds were sitting side by side on the nest. I hear from Mr. Pike that he did not allow them to hatch out, fearing that it might interfere with their attachment to one another.

"The eagle is very tame and fond of Mr. Pike; he goes into the cage, and it allows him to handle it as he likes, but will not allow any one else near it. It never attempts to get out of the hole made for the goose to go in and out."

Sense of Force and Sense of Temperature

THE sense of force, or of resistance to pressure, and the sense of temperature, have been very commonly confounded under one name, "sense of touch." Indeed, I think they are still imperfectly distinguished in many modern works dealing with the subject of sensation. Nevertheless, there can be no doubt as to these two being sensations altogether distinct. It is even quite probable that they are observed and transmitted by distinct nerve-systems.

As an important and interesting question arises as to the kind of information given to us by these two senses; viz., how far it is merely relative, and how far these senses may, by cultivation, be made to give us absolute information.

So far as the sense of force is concerned, it is with most persons chiefly relative. Every one is prepared to say, but generally very roughly, that of two bodies, A and B, A is heavier

than B. To test their relative weights we lift first the one and then the other, and decide between them. Sometimes we may go a little farther towards making an absolute estimate by means of the sense of force. I can tell, for example, that a weight is greater than 20 lbs. and less than 30 lbs. by trying to hold it out at arm's length; and most likely with a little practice I could learn to estimate weights to within closer limits than 5 lbs. on each side of 25 lbs. But such testing as this is all that is done in ordinary cases.

There is, however, a very remarkable case in which the sense of force is made absolute to a high degree by practice. It is the case of letter-sorters in the Post Office, who learn to distinguish letters that are over a particular weight with accuracy that is perfectly marvellous. It would be very interesting to try a series of experiments with letters of different weight, some slightly under weight for a particular postage, and some slightly overweighted, and to observe the errors or rather the limits of uncertainty.

The sense of temperature may also be rendered absolute to a certain extent. Several instances might be mentioned, some of which depend, as in the case of testing force by lifting the greatest possible weight in a particular way, on the limit of endurance.

One remarkable case of an absolute determination of temperature by the senses is that of the plumber and tinsmith who are in the habit of holding up the soldering bolt to the face, and judging by feeling whether it is at the proper temperature for a particular piece of work in hand.

Probably there are other cases in the arts in which the sense of temperature is cultivated to a high degree. It is in the hope of getting information on this subject through your readers that I address this note to you.

J. T. B.

April 7

Did Flowers Exist During the Carboniferous Epoch?

MR. A. R. WALLACE, in his review of Mr. Allen's, "The Colour Sense" (NATURE, vol. xix. p. 501), has been misled in supposing the fossil insect from the Belgian coal-fields, named *Breyeria borinensis* may be a moth. It was originally described as the hind wing of an orthopterous insect, under the name of *Pachytolopsis borinensis* (Comptes Rendus, Soc. Ent. Belg. xviii. p. xli). Subsequently it was transferred to the lepidoptera on bad advice, and re-named *Breyeria borinensis* (same Comptes Rendus, p. lx.). Its original location was nearer the truth. I examined the fossil at Brussels in 1877, and have no doubt it belongs to the pseudo-neuroptera, family Ephemeridae (vide my note to this effect in the same Comptes Rendus for 1877, xx. p. xxxvi.). The very dense transverse reticulation did not receive sufficient importance when M. de Borre was induced to refer it to the lepidoptera. Thus we remain without any zoological evidence that would tend to prove the existence of flowering plants in the carboniferous age.

R. McLACHLAN

Lewisham, April 4

Water-level Indicators

I OBSERVE in NATURE (vol. xix. p. 518) a description of what is stated to be a new form of water-level indicator which has lately been erected by the India-rubber, Gutta-percha, and Telegraph Works Company, at the Leamington New Waterworks.

So far as mere form goes, it possibly may be considered new, but hardly so in any other sense, as a water-level indicator, fulfilling the purposes you mention, on a very extended scale, has been in action at the Nottingham Waterworks for many months past. It is not only capable of being made to give smaller indications than one foot, but is actually doing so. This apparatus was designed and constructed in the electrical department of the General Post Office, and has given great satisfaction. I may mention that it was under the consideration of Mr. Preece so far back as the latter end of 1877, and but for his determination to have an instrument perfect in every respect before he turned it out, it might have been at work early in 1878.

Nottingham, April 8

H. ROFE

Eastern Yucatan

Is there any information to be had about Eastern Yucatan? In 1847 the Maya Indians there rose against Mexico and have become independent. The animosity between them and the Mexicans is so great that there is scarcely any possibility of

penetrating to the Independent Indians of Eastern Yucatan from the western part of the peninsula, which remains Mexican. But should this not be possible from Belize (British Honduras)? I have heard that the coloured people of the colony trade with the Mayas. Would it be possible then to obtain some information in this way?

As to the interest of a visit to the Maya country by an educated traveller it would bear especially (1) on the condition of the people since they are free from their white masters. How does it compare with the condition of the Mayas of Western Yucatan, who live in a *de facto* serfdom to the large landowners? (2) The antiquities, of which we have a description by Stephens, but certainly would know more. Very likely the Mayas will allow a white man who is not a Spanish-American to travel in their country; they have no special reason to hate anybody except the latter.

A. WOIWKOF

Jurschtatskaya, 9, St. Petersburg, March 25

Deltaic Growth

IN reference to the question as to the amount of sediment brought down by Delta Rivers, I had occasion in 1877 to ascertain the amount of sediment carried by the waters of the River Plate, and found it to amount to the $\frac{1}{1000}$ part by weight. Mr. J. F. Bateman, the well-known hydraulic engineer, in his report on the proposed harbour of Buenos Ayres, fixes the minimum flow of the River Plate at 670,000 cubic feet per second. Assuming its mean volume at 700,000 cubic feet per second (a quantity very much under the mark), it would appear that this river carries seaward some 224,000 tons of sediment every twenty-four hours—or say, in round numbers, 82,000,000 tons every year.

Some portion of this sediment is deposited in the 100 miles of river that intervene between Buenos Ayres and the sea, forming the great banks that render the navigation of the River Plate so troublesome, but a large portion is carried out to sea and deposited beyond the mouth.

I have been informed by captains of steamers trading with Buenos Ayres that the soundings shown on the chart of the coast of Uruguay vary considerably, in many places, from the actual ones now existing, and I have little doubt that a correct survey of this coast would show changes as marked as those discovered by Mr. Doyle near Rangoon.

The subject is one of great importance, as the coast of Uruguay is a difficult and dangerous one to make, and from the low character of the coast, the frequency of fogs, and the great uncertainty of the currents, captains have frequently to depend a great deal on the lead to ascertain their position when making this land. During the last few years several fine steamers—French, German, and English—have been lost on this coast near the Castillos, when making the land.

GEORGE HIGGIN

3, Great George Street, Westminster, S.W., April 10

Temperature Equilibrium in the Universe in Relation to the Kinetic Theory

MY attention has been called to an ambiguous phrase in my recent paper¹ on the above subject (*NATURE*, vol. xix. p. 460) which it is necessary to rectify. On page 461 is the sentence "*Let us suppose now the excessive temperature to fall, or, in other words, the total energy to diminish.*" This is meant as a *supposition*, not as a possible case. The imaginary rise and fall of temperature in the universe are given merely for the sake of aiding the conceptions of the actual facts, by affording *imaginary* cases to show what the effects would be if such cases were possible.

S. TOLVER PRESTON

London, April 15

Transportation of Seeds

THE penetration of seeds of the so-called "flechilla" grasses into the flesh of Australian sheep is too well known to squatters. On some "runs" these grasses are so abundant that the annual loss of stock is a very serious matter. The ripe seed falls upon the wool, and, owing to the re-curved barbles with which it is armed, easily penetrates to the skin, when, its point being as sharp as a needle, every movement of the animal tends to drive

it into the flesh. I have found the internal organs so crowded with seeds that they felt like a bag of needles if squeezed in the hand.

ARTHUR NICOLS

Earthquakes

A SHOCK of earthquake was felt in this neighbourhood on the evening of Tuesday, April 8, at 8'35 (about). We were sitting in the drawing-room of this house, when we heard a sound like the rumbling of a heavy waggon, or distant thunder. It increased in loudness till the room slightly vibrated and the window rattled, as it seemed to pass the house. From the peculiar nature of the sound, and the fact that we are some 50 feet above the road, and 80 or 100 yards from it, I felt certain the disturbance was due to an earthquake and not a passing waggon, but walked to the window to listen, when I heard the sound dying away in the distance. It seemed to come from the south-east, and travel towards the north-west, and to be audible, from first to last, for some seconds, perhaps five or six, because we spoke one to another during the time. I find that the shock was noticed by other people in the neighbourhood, and that in a cottage near Bettws Gormon, a mile or so from here, two glass bottles were thrown down from a high shelf and broken.

T. G. BONNEY

Bron Celyn, near Bettws y Coed, North Wales, April 10

WE were visited by an earthquake of some violence this morning at 2 A.M. (Cadiz mean time). The shock was preceded by a profound subterranean noise like that of a distant carriage, and it extended to Port St. Mary and Port Royal (six miles). The earthquake travelled from south to north approximately; some clocks stopped.

AUGUSTO T. ARCIMIS

Cadiz, April 3

OUR ASTRONOMICAL COLUMN

BESSEL'S NEBULA IN PERSEUS.—On November 8, 1832, in zone 527, Bessel observed an object, which he recorded as a nebula, distant about one degree from 20 Persei. It is No. 1,063 of Weisse's second Catalogue, where, though called a nebula, it has 9m. attached. D'Arrest, in his "Resultate aus Beobachtungen der Nebelflecken und Sternhaufen," has two observations, in January, 1856, to the first of which he attaches a note that no nebulosity was visible in Bessel's position, and that possibly a comet was observed; the second observation records a star 9'10m., without trace of nebulosity or diameter, the place of which was found to be within a few seconds of arc from Bessel's position, preceded 24'22s. by a star 9m., 76" to the north. In "Siderum Nebulosorum," &c., D'Arrest remarks: "Star 9m. quæ Besselio quondam nebulosa apparuit . . . Argelandro in Perlustratione ceu fixa 9'3 magn. apparuit; nobis sæpius insipientibus nunquam nebulosa visa." This refers to the star in the "Durchmusterung," at 2h. 43m. 56'5s. + 36° 54'2"; Argelander has another star of the same magnitude, 9'3, 10' south. Are we to infer that Bessel's star was surrounded in 1832 by nebulosity so conspicuous that it was caught at once in his zone observations, which had wholly disappeared in 1856, or, as appears the more probable conclusion, that at the time of his meridian observation a comet happened to be centrally over the star? In this case the observation gives its place for 1832 November 8 at 10h. 10m. 25s. G.M.T.; the catalogued position for 1825'0 is in R.A. 2h. 42m. 5'56s., Decl. + 36° 46' 46"7.

This observation of Bessel's might at first sight appear of some interest, considering that the comet of the November meteors (1866 I.) must have been near perihelion about November 1832, but upon further examination it will be found that with the elements of 1866 it is not possible to bring the comet near the observed position of the "nebula," upon any assumption as to the time of its arrival in perihelion.

BRORSEN'S COMET.—Comparing the second of the two observations on April 4, in Major Tupman's letter pub-

¹ "On the Possibility of Explaining the Continuance of Life in the Universe Consistent with the Tendency to Temperature-Equilibrium."